

Claims

[c1] 1.A method for dissipating electrical power in a fuel cell power system, said fuel cell power system including a fuel cell stack of at least one fuel cell for generating electric power and a compressor for delivering a gas containing oxygen to said fuel cell stack, said method comprising:
determining an amount of said electrical power to be dissipated;
operating said compressor to draw electric current as required to dissipate said amount of said electric power; and
valving said compressor to reduce delivery of gas to said fuel cell stack.

[c2] 2.The method of claim 1 wherein the step of valving said compressor to reduce delivery of gas to said fuel cell stack further comprises restricting the flow of said gas.

[c3] 3.The method of claim 2 wherein the step of restricting the flow of said gas comprises restricting an input of gas into said compressor.

[c4] 4.The method of claim 3 , wherein said compressor creates a vacuum.

[c5] 5.The method of claim 1 wherein the step of valving said compressor further comprises venting an output of said compressor.

[c6] 6.The method of claim 5 , wherein said compressor output is vented to the atmosphere

[c7] 7.The method of claim 1 wherein the step of valving said compressor further comprises inefficiently operating said compressor to reduce delivery of said gas to said fuel cell stack.

[c8] 8.A method for dissipating electrical power in a vehicle having a fuel cell power system for generating electricity and having a regenerative braking system for converting kinetic energy into electrical energy, said fuel cell power system including a fuel cell stack of at least one fuel cell for generating electric power and a compressor for delivering gas containing oxygen to said fuel cell stack, said method comprising:
determining an amount of said electrical power to be dissipated;

operating said compressor to draw electric current as required to dissipate said amount of said electric power;

valving said compressor to reduce delivery of gas to said fuel cell stack.

[c9] 9.The method of claim 8 wherein the step of determining an amount of said electrical power to be dissipated further comprises the steps of summing the minimum amount of electrical power that can be generated by said fuel cell system and said regenerative braking system, and subtracting an amount of electrical power required by said vehicle.

[c10] 10.The method of claim 9 further comprising providing an electrical power storage device and wherein the step of determining the amount of said electrical power to be dissipated further comprises the step of subtracting the amount of electrical power capable of being stored in said electrical power storage device.

[c11] 11.The method of claim 8 wherein valving said compressor to reduce delivery of gas to said fuel cell stack comprises restricting the flow of said gas.

[c12] 12.The method of claim 11 wherein the step of restricting the flow of gas containing oxygen further comprises restricting an input of said compressor

[c13] 13.The method of claim 12 wherein said compressor creates a vacuum.

[c14] 14.The method of claim 8 wherein valving said compressor comprises venting an output of said compressor.

[c15] 15.The method of claim 14 wherein said compressor is vented to the atmosphere

[c16] 16.The method of claim 8 wherein the step of operating said compressor to draw an electrical power load equivalent to said determined amount of said electrical power to be dissipated further comprises generating a feed-forward output signal to adjust said compressor speed to draw an electrical load equivalent to said determined amount of said electrical power to be dissipated.

[c17] 17.The method of claim 8 wherein the step of valving said compressor further comprises inefficiently operating said compressor to reduce delivery of said gas to said fuel cell stack.

[c18] 18.A fuel cell powered system vehicle comprising:
a fuel cell stack of at least one fuel cell;
a regenerative braking system for converting kinetic energy of said vehicle into electric energy;
an electrically powered traction motor capable of being energized by electric power generated by said fuel cell stack;
an electrically powered compressor having an inlet for receiving gas containing oxygen and having an outlet for discharging gas, said compressor for supplying gas to said fuel cell stack;
an adjustable valve for controlling the flow of gas; and
a control system comprising
a summing device for determining an amount of said electric power to be dissipated from said vehicle;
a processor for generating a signal to adjust said compressor speed to draw electric current as required to dissipate said amount of said electric power; and
a device for controlling said valve to control a supply of gas to said fuel cell stack.

[c19] 19.The vehicle of claim 18 wherein said traction motor is operable to function as a generator for said regenerative braking system.

[c20] 20.The vehicle of claim 18 wherein said valve is provided upstream of said compressor inlet for regulating the flow of gas containing oxygen into said compressor.

[c21] 21.The vehicle of claim 18 wherein said adjustable valve is provided downstream of said compressor outlet for venting the flow of gas containing oxygen to the atmosphere.

[c22] 22.The vehicle of claim 18 further comprising an electrical power storage device for storing electrical power generated by said fuel cell stack or said regenerative braking system, and for supplying electrical power to said vehicle.